Proceedings of ANAS (Biological and Medical Sciences), vol. 73, No 2, p. 169-171 (2018)

Significance of the Initial Material in Developing New Short Wheat Varieties

A.M. Abdullayev, S.T. Hajiyeva*, S.K. Hajiyeva, R.R. Asgarli

*Department of Plant Physiology and Biotechnology, Research Institute of Crop Husbandry, Ministry of Agriculture of the Republic of Azerbaijan, Pirshaghy Settlement, Sovkhoz No 2, Baku AZ 1098, Azerbaijan; *E-mail: sevda.hajiyeva @mail.ru*

Heights of 464 local and foreign, durum and bread wheat varieties of various geographical origin were determined in 2016-2017 vegetation years. From 259 bread wheat varieties 12.3% (32) appeared to be semi-dwarf (51-80 cm), 87.7% (227) of the genotypes were middle-height (81-110 cm). From 205 durum wheat genotypes 14.6% (30%) was semi-dwarf (51-80 cm), 81.0% (166) middle-height (81-110 cm) and 4.4% (9) was tall (111-140). Semi-dwarf bread and durum wheat genotypes were chosen as a genetic source and used in hybridization for breeding short varieties.

Keywords: *Breeding, bread wheat, durum wheat, plant height*

INTRODUCTION

Cereal plants and their products are known to be indispensable in the world agricultural system, including the Azerbaijan economy. As wheat is a main food plant in our country, increasing its production is an urgent issue and the development of this area is one of the priority directions. Due to the diversity of soil and climatic conditions in Azerbaijan, one of the main tasks facing the selectionists is developing 70-100 cm bread and durum wheat varieties, for irrigated and wetland areas, which are adaptable to high agraphone and resistant to lodging. Whereas, for dryland and rainfed zones medium height varieties, resistant to frost, drought and diseases, with high grain quality and productivity have to be developed.

Since the beginning of the last century researchers have been paying attention to short wheat genotypes. Prominent scientists, such as N.I.Vavilov and J.A.Aliyev noted the importance of short varieties in developing high productive wheat genotypes. In short varieties the ratio of grain product to straw is approximately 1:1 and in tall varieties more photosynthetic products are expended to straw than to grain (Aliyev, 1983; Recomendations for ...., 1984; Vavilov, 1985). According to D.J.Miralles et al. the study of wheat varieties having various morphophysiological properties showed that plant height profoundly affected productivity. According to the results of the experiments performed for the last 20 years, for the potential productivity, the optimal plant height should be 70-100 cm. When plants are shorter, in spite of the increasing agricultural index, a decrease in biomass per unit area is observed (Miralles and Slafer, 1995; Villegas et al., 2001).

MATERIALS AND METHODS

The investigations were conducted at the experimental station of the Research Institute of Crop Husbandry under irrigated conditions in 2016-2017. Seeds of 464 local and foreign, durum and bread wheat varieties of various geographical origin were sowed in the first decade of November, in 2016, using leguminous plants as predecessors. Sowing norm for bread and durum wheat genotypes was accepted as 400 grains, having germination ability, per $1m^2$ area. Multiple seedlings were observed in the second decade of November.

Samples were taken from bread wheat varieties Murov 2, Fatima and durum wheat varieties Barakatli-95 and Garabagh. A complex fertilizer (nitrophoska) -100 kg per a hectare was applied before sowing. In the early spring during the tillering phase 90 kg ammonium nitrate fertilizer (NH_4NO_3) was applied per hectare-determined as kilograms of active substance per hectare. During the vegetation period samples were watered at the leaf tube formation, earing and grain filling stages and respective agrotechnical care was provided in the experimental field. Using the available method heights of the studied plants were determined (Musayev et al., 2008).

RESULTS AND DISCUSSION

Heights of the studied wheat varieties were 93.6 cm and 90.8 cm in Murov 2 and Fatima, respectively. Whereas, heights of other varieties were in the range 67-100 cm. From 259 bread wheat genotypes 12.3% (32) was found to be semi-dwarf (51-80 cm), and 87.7% (227) medium-height

plants (81-110 cm) (Fig. 1).

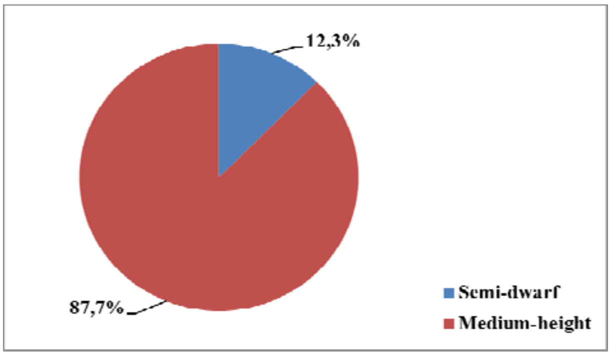


Fig. 1. Heights of bread wheat varieties.

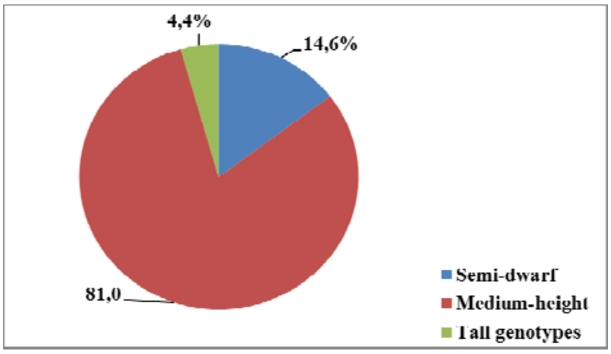


Fig. 2. Heights of durum wheat variety samples

P-7, N12 (SIMMIT)- 69 cm; P-3, N25 (SIMMIT)-70 cm; Spichka (Russian)-74 cm; Grom (Russia)-76 cm; Shafag 79.3 cm; Nurlu 99 (Azerbaijan)-80 cm etc. were found to be semi-dwarf (69-80cm) varieties. Murov- 81.5 cm; Markhal-82.1; Zirva 85 (Azerbaijan)-92.3 cm; Vassa (Russia)-90.2 cm; Guneshli (Azerbaijan)-95.4 cm; Saratovskaya-29 (Russia)- 110 cm etc.- medium height varieties (81-110 cm).

From the studied 205 durum wheat varieties, 14.6% (30) was semi-dwarf (51-80 cm), 81.0% (166) medium height (81-110 cm) and 4.4% (9) tall (111-140 cm) (Fig. 2).

Heights of durum wheat genotypes Barakatli 95 and Garabagh were 91.8 cm and 93.8 cm, respectively. Whereas, heights of the other varieties changed in the range 70-136 cm. P-11, N10 (SIMMIT)-70 cm; P-10, N78 (SIMMIT)-73 cm; 16 W. Durum Entri 88-78 cm; 16 W. Durum Entri 89-78 cm appeared to be semi dwarf (51-80 cm). Garagylchyg 2 - 95 cm; Tartar 2 (Azerbaijan)-89 cm, Zatino (France)- 92 cm etc.- medium height varieties. v.coemlesens (Azerbaijan)-132 cm, *v.apulicum* (Azerbaijan)-136 cm etc.-tall varieties.

As a result of the research semi-dwarf bread and durum wheat genotypes were chosen as a genetic source and used in hybridization for breeding short varieties.

REFERENCES

Vavilov N.I. (1985) Scientific foundations of wheat breeding. M-L.: Selkhozlit, p. 3-28 (in Russian).

Aliyev J.A. (1983) The modern conception of ideal wheat. *Pr9iceedings of Azerbaijan SSR Academy of Sciences, series of biological sciences*, **No 3:** 3-14 (in Russian).

Recommendations for obtaining abundant and highly qualified production from agricultural plants (1984) Baku, p. 6-7 (in Azerbaijani).

Miralles D.J., Slafer G.A. (1995) Yield, biomass and yield components in dwarf, semi dwarf and tall isolines, lines of spring wheat under recommended and late sowing dates. *Plant Breeding*, **114:** 392-396.

Villegas D., Aparicio N., Blanco R. et al. (2001) Biomass accumulation and main stem elongation of durum wheat grown under Mediterranean conditions. *Annals of Botany*, **88(4):** 617-627.

Musayev A.S, Huseynov H.S, Mammadov Z.A. (2008) Technique of field experiments in the breeding of cereal plants. Baku, 34 p. (in Azerbaijani).

Alçaqboylu Yeni Buğda Sortlarının Yaradılmasında Başlanğıc Materıalın Əhəmıyyətı

A.M. Abdullayev, S.T. Hacıyeva, S.K. Hacıyeva, R.R. Əsgərli

Azərbaycan Respublikası KTN Əkinçilik Elmi Tədqiqat İnstitutunun Bitki fiziologiyası və biotexnologiya şöbəsi

Məqalədə 2016-2017-ci vegetasiya ilində bərk və yumşaq buğdanın 464 yerli və müxtəlif coğrafi mənşəli xarici sortnümunələrinin boylarının tədqiqinin nəticələri öz əksini tapmışdır. Tədqiq edilən 259 yumşaq buğda genotiplərinin 12,3%-i (32-si) yarımkarlik (51-80 sm), 87,7%-i (227-si) ortaboylu (81-110 sm), 205 bərk buğda genotiplərinin 14,6%-i (30-u) yarımkarlik (51-80 sm), 81,0%-i (166-sı) ortaboylu (81-110 sm) və 4,4%-i (9-u) isə hündürboylu (111-140 sm) olmuşdur. Tədqiqatlar nəticəsində yarımkarlik yumşaq və bərk

buğda genotipləri genetik mənbə kimi seçilərək alçaqboylu sortların yaradılması məqsədi ilə hibridləşmədə istifadə edilmişdir.

Açar sözlər: *Seleksiya, yumşaq buğda, bərk buğda, bitkinin boyu*

Значение Исходного Материала При Выведении Новых Низкорослых Сортов Пшеницы

А.М. Абдуллаева, С.Т.Гаджиева, С.К. Гаджиева, Р.Р. Асгарли

Отдел физиологии растений и биотехнологии Научно-исследовательского института земледелия МСХ Азербайджанской Республики

Рост 464 местных и зарубежных сортов твердой и мягкой пшеницы различного географического происхождения определяли в 2016-2017 вегатационные годы. Из 259 сортов мягкой пшеницы 12,3% (32) оказались полукарликовыми (51-80 см), 87,7% (227) - среднерослыми (81-110 см), а из 205 генотипов твердой пшеницы 14,6% (30%) оказались полукарликовыми (41-80 см), 81,0% (166)- среднерослыми (81-110 см) и 4,4% (9) высокорослыми (111-140). В качестве генетического источника были выбраны полукарликовые генотипы мягкой и твердой пшеницы, которые использовались в гибридизации для выведения низкорослых сортов.

Ключевые слова: *Селекция, мягкая пшеница, твердая пшеница, рост растения*